275. Proposed by PROFESSOR WILLIAM HOOVER, Ph. D., Athens, Ohio.

An hyperbola is drawn touching the axes of an ellipse, and the asymptotes of the hyperbola touch the ellipse. Prove that the center of the hyperbola lies on one of the equal conjugate diameters of the ellipse.

276. Proposed by G. I. HOPKINS, Manchester, N. H.

ABC is an equilateral triangle whose vertices are the centers of circles with radius *AB*, and *H* is the center of the arc *AB*. From *F*, the point of intersection of the circles whose centers are *A* and *C*, a line is drawn through *H* to the circumference *CAN*. Draw *BN*, and prove that the angle *ABN* is an angle of a regular pentagon.

MECHANICS.

186. Proposed by R. D. CARMICHAEL, Hartselle, Alabama.

A point *P* keeps at uniform distance from and moves with uniform angular velocity around a point *Q* which is in harmonic motion, making one revolution while *Q* swings to and fro. If *P* is in the line of the path of *Q* and on the same side of the center of that path with *Q* when *Q* is at the extremity of the path, what is the locus of *P*?

UNSOLVED PROBLEMS.

NOTE. The following problems still remain unsolved (in our columns).

Algebra, 179. Proposed by DR. L. E. DICKSON, The University of Chicago.

Find the roots of the algebraically solvable quintic equation

$$x^2+qx^2+px+\tfrac{1}{5}\left[\frac{q^2}{p}-\frac{p^3}{5q}\right]=0.$$

Geometry, 267. Proposed by W. W. LANDIS, Dickinson College, Carlisle, Pa.

Prove that every orthogonal system of circles is an isothermal system.

Group Theory, 9. Proposed by DR. L. E. DICKSON, The University of Chicago.

Does there exist a triply transitive group on m letters of order $m(m-1)(m-2)$ other than the linear fractional group in the Galois Field of order $p^n=m-1$ and the group 720_3 on ten letters (Cole, *Quarterly Journal*, 1895, p. 44)? This question relates to Problem 99, MONTHLY, March, 1900.

Miscellaneous, 151. Proposed by W. J. GREENSTREET, M. A., Stroud, England.

Sum the series $\sum\limits_{r=1}^{r=m} \operatorname{cosec}\left[\frac{2r-1}{4m}\pi+\theta\right]\operatorname{cosec}\left[\frac{2r-1}{4m}\pi-\theta\right]$.